

NEW METHOD

FOR OBTAINING THE

LONGITUDE

AT SEA.

By WILLIAM FAIRMAN

TEACHER OF THE MATHEMATICS.

LONDON:

Printed for the AUTHOR; and Sold by G. KEARSLEY, No. 46, Fleet-street,
and at the AUTHOR's House, No. 4, Gould's-Square, Crutched Friars,

M.DCC,LXXXIII.

[Price ONE SHILLING.]

W. M. T. H. O. G.

THE CHURCH OF THE FUTURE

LONGITUDINAL

THE CHURCH OF THE FUTURE

THE CHURCH OF THE FUTURE

THE CHURCH OF THE FUTURE

THE CHURCH OF THE FUTURE

THE CHURCH OF THE FUTURE

THE CHURCH OF THE FUTURE

THE CHURCH OF THE FUTURE

TO THE HONORABLE
COMMISSIONERS OF LONGITUDE.

GENTLEMEN,

FROM your requesting that my Proposals for obtaining the Longitude at Sea might be made Trial of, and that Certificates might be produced of their Efficacy towards their being considered the 1st of next *March*, the Time appointed for your next Meeting, I here take the Liberty of offering to the Public a true Copy of my Letters, which remain in your Possession, and which were delivered at the Board on the 22d ~~Instant~~, not doubting but by such Conduct I shall be able to produce many ample Testimonies of its answering the Purpose required.

I am,

Honorable Gentlemen,

Your most obedient Servant,

WILLIAM FAIRMAN

Dec 4. 1783

TO THE HONORABLE

COMMISSIONERS OF LONGITUDE

THE AUTHOR will attend at his House in *Gould's-Square*,
 from 9 'till 10 o'Clock, on *Wednesday* and *Friday* Mornings,
 for one Month from the first of *December*, 1783, for the Pur-
 pose of solving any Doubts which may arise concerning any
 Part of his Scheme; and will, if required, shew the Reason
 for any or every Part of what he has advanced, and will
 answer Post paid Letters on the Subject.

1783
 11/11/83

HONOURABLE GENTLEMEN,

AMONG many Methods which I have pursued for the Discovery of Longitude at Sea, the following one I have found to be depended on, and have Reason to believe it will prove more exact than any other which has been proposed, as it is freed from the Necessity of a Multiplicity of Corrections and Instruments, and is chiefly founded on those correct and excellent Calculations which are published in the Ephemeris.

WHAT I have to propose, HONORABLE GENTLEMEN, for finding the Longitude, is by measuring the Distance in Time of the Moon from the Sun, or a Star, (whose angular Distance from the Moon is given in the Ephemeris) by a Watch beating Fifths of Seconds, and by a self-evident Method of regulating such Distance in Time given by the Watch, to the true Time. The application of which is as follows, viz.

MEASURE the Distance in Time from the Centre of the Sun or a Star's being on the Meridian, 'till the Centre of the Moon is on the Meridian; and likewise from such Time

B

'till

'till the * Centre of the Sun, or the Star observed, comes again to the Meridian—then, the least of these Distances in Time, will be that whose angular Distance is given in the Ephemeris—then, as the Sum of the Times given by the Watch (of the Distance of the Object from the Centre of the Moon on each Side) is to 24 Hours if the Sun, and about 23 Hours and 56 Minutes if a Star, so is the least Distance asunder given by the Watch, to the true Distance in Time, which Time must be reduced into Degrees, &c. and sought in the Ephemeris;—then the Difference between the Time answering to this Distance in the Ephemeris, and the Time of the Ship when the Moon was on the Meridian, will, if reduced into Degrees, &c. give the Longitude of the Place where the Moon was observed to be on the Meridian.

WHAT Longitude is made by the Ship in the intermediate Times of the Distance of the Object observed from the Centre

* To reduce the Observation to the true Distance of the Centres of the Sun and Moon from the Extremity of either of their Sides being taken, their Semidiameters at the Time of the Observation must be reduced into Time, and applied by Addition or Subtraction, as Occasion requires—that of the Sun may be reduced into Time by dividing by 15, and that of the Moon by saying, as 360 Degrees is to the apparent Time of the Revolution of the Moon (from the diurnal Motion of the Earth and the Moon's Motion in her Orbit) at that Time, so is the Moon's Semidiameter to its corresponding Time. If it should be objected that the exact Time of an Object's being on the Meridian cannot be sufficiently determined, the Author has Methods to propose whereby an Error of that Kind may be rectified.

of

of the Moon on each Side, must be reduced into the Times that they will make of the diurnal Motion of the Moon in her Orbit, for the Time of Observation, by saying, as 360 Degrees is to the Moon's diurnal Increase or Decrease in Distance from the Object observed, so is the Longitude sailed in each Distance of Time, to the proper Distance which it makes of the Moon's Motion; which Distances must be reduced into Time and added to, or subtracted from their respective Distances in Time which were given by the Watch, according as they are East or West.

If what I have here asserted, HONOURABLE GENTLEMEN, should not seem clear, I shall be happy to be called on to vindicate and prove what I have alledged.

I am,

Honourable Gentlemen,

With the utmost respect,

Your obedient Servant,

WILLIAM FAIRMAN.

Gould's Square,

Crutched Friars,

May 21, 1783.

*To the Hon. the Commissioners
of the Longitude.*

A SUP.

A SUPPLEMENT to the foregoing LETTER.

TO find the Time of a Celestial Object's coming to the Meridian—Take several Altitudes of the Object when on the Eastern Part of the Meridian of the Place of Observation, and note the exact Time of each Altitude; and observe likewise the exact Times of the corresponding Altitudes of the same Object on the Western Part of the Meridian of the Place of Observation; find the half Distance of Time between each corresponding Altitude, and take the mean Time between the several Times which each Pair of Altitudes will give for the Time (by the Watch) that the Object will be on the Meridian.—In this Method, If the Times of the Altitudes on either Side of the Meridian are taken both too much or both too little, one Error corrects the other; and which ever Side an Error is made of, it becomes only half from the Division. Good Criteria may be had for discovering the Truth of an Operation of this kind, by observing whether the Times are equal between any Two Altitudes on one Side and the two corresponding ones on the other.

THE Reference from the Word Center, in the Scheme, will be of Use for the obtaining the exact Longitude upon Land, where either an Azimuth Compass may be used, or any other Instrument which will shew the Time of an Object's passing the Meridian.

IN the Scheme it is likewise directed to seek in the Ephemeris the Distance between the Moon and Object; therefore, among the Distances of the Objects on the Day of Observation, seek for this computed Distance; and if it be there, the Time of Observation at Greenwich is at the Top of the Columns above it; but if the computed Distance falls between two Distances in the Ephemeris, as it almost always will, then say—as the Difference between the two nearest Distances in the Ephemeris is to 3 Hours, so is the Difference between the first of these Distances and the computed Distance to the Time; which added to the Time standing over the said first Distance in the Ephemeris, gives the Time that such Distance happened at Greenwich: the Difference between which, and the Time of the Ship, is the Longitude of the Ship when the Moon was on the Meridian.

To the Honorable and Respectable GENTLEMEN
of the NAVY, MERCHANTS, &c.

GENTLEMEN,

I Doubt not but the great Utility of the Subject in Question will be a sufficient Incitement towards gaining it an impartial Investigation and Trial—the exactness required in finding the Time of the Watch that an Object comes to the Meridian, is the only Part of the Operation where there is a Possibility of making an Error, (except what trifling one may proceed from the Dead Reckoning between the Times of the Object's being on the Meridian;) and this Part, where the exactness is required, may in a great measure be obviated by means of the Properties mentioned of corresponding Altitudes and by further Criteria which may be established by the Assistance of the Ephemeris, and by repeating the Practice of the Methods I have offered, constantly observing whether the Distance in Time of the Moon's coming to the same Meridian answers to the Ephemeris when the Longitude of the Ship from Greenwich, and the Time made ^{supposed} by the Ship's Run between the Moon's being twice on the Meridian, is taken into the Account.

Account.—The Methods now in Use, beside the Exactness required in taking the Angular Distance between the Moon and Object, are liable to others from the Watch—from the Altitudes, from the Proportions for finding the Increase or Decrease of the Horizontal Parallax and Diameters for the reduced Time, and from the different calculated Tables which are necessary.

GENTLEMEN, I doubt not but, upon this Method's proving efficacious, you will condescend to send me Testimonies of its Effect. .

I am,

Gentlemen,

Your most obedient

and most humble Servant,

WILLIAM FAIRMAN.

T H E E N D,

Account.—The Method now in Use, beside the Exactness required in taking the Angular Distance between the Moon and Object, are liable to errors from the Watch—from the Altitude, from the Proportions for finding the Increase or Decrease of the Horizontal Parallax and Diameters for the reduced Time, and from the different calculated Tables which are necessary.

Gentlemen, I doubt not but, upon this Method's proving accurate, you will condescend to send me Testimonies of its

I am,

Gentlemen,

Your most obedient

and most humble Servant,

WILLIAM FAIRMAN.

T H E E N D